has already received the patronage of the universities and leading scientific societies both at home and abroad, which will be represented by delegates. The programme of papers already contains contributions from the best known authorities on the history and ethnology of the vast region over which its operations extend. It may be hoped that the many persons interested in prehistoric America will assist in the work of the Congress, and that collectors will contribute specimens of antiquities to the exhibition which will be organised in connection with it.

In view of the approaching Congress, Mr. Harlan J. Smith, superintendent of the Archæological and Ethnological branch of the Geological Survey of Canada, appeals for the aid of trained field-workers in the exploration of the vast number of prehistoric sites in various parts of the Dominion. In one township in Ontario a casual investigation disclosed no fewer than thirty ancient sites, and on the seacoast the kitchen middens are of great extent and interest. Canada at present cannot supply a sufficient staff of trained workers to carry on this survey, and the scheme suggests a promise of interesting scientific work in which some of the younger anthropologists trained in our university schools may be inclined to cooperate.

PROF. EDWARD DIVERS, F.R.S.

We regret having to record the death of Prof. Edward Divers, F.R.S., which occurred on April 8. Born in London on November 27, 1837, he was educated at the City of London School, at the Royal College of Chemistry, and at Queen's College, Galway. In 1870 he was appointed lecturer on medical jurisprudence at the Middlesex Hospital Medical School, and in 1873 he went to Japan as professor of chemistry in the College of Engineering of the Imperial University at Tokyo, of which he became principal in 1882. He remained in Japan until 1899, when he was made emeritus professor and received the Order of the Sacred Treasure, in addition to that of the Rising Sun, which had been previously conferred upon him.

During the whole period of his active professorship, Dr. Divers alone and in collaboration with a succession of his Japanese students, Shimosé, Shimidzu, Haga, Kawakita, Nakamura, Ogawa, and Hada, was a prolific contributor to chemical science—hyponitrites, the constitution of fulminates, the quantitative separation of tellurium and selenium, the production of hydrosulphides, the constitution of sulphazotised salts, the red sulphur of Japan, hydrocarbon from Japanese petroleum, the composition of Japanese birdlime, the economical preparation of hydroxylamine sulphate, and many other subjects were dealt with in papers published in the Journal of the Chemical Society and the Philosophical Transactions. In 1893 he was elected a Fellow of the Royal Society.

On his return to England, Professor Divers did not cease his activity. He was a Vice-President of the Chemical Society and of the Institute of Chemistry, President of the Chemical section of the British Association, President of the Society of Chemical Industry, and at the time of his death was still serving as the representative of the last-named society on the governing body of the Imperial College of Science and Technology, whilst as late as last year he contributed to the Society of Chemical Industry a lengthy paper on "A modification of Raschig's theory of the Lead-Chamber process."

Prof. Divers married in 1865 Margaret Theresa Fitzgerald, daughter of D. G. Fitzgerald, of Mayfield, Co. Cork, by whom he had one son and two daughters. His son died in early life, and he lost his wife in 1897, shortly before his return from Japan, but his two daughters survive him. A man of fine physique, and, until within the last few months, of splendid health, he appeared to suffer only from defective sight, largely the result of a laboratory explosion, which practically destroyed the sight of his right eye. This accident happened in 1885, but he did not allow it seriously to interfere with his work, though it was painful to others to watch him read or write with the book or paper held within a few inches of his eyes. In public he always felt the disability of being unable to recognise acquaintances that were more than a few feet distant, and this naturally gave him an appearance of reserve. But in small gatherings and among intimate friends he was a delightful companion, genial and humorous, especially pleased to talk about Japan and the Japanese, for everything connected with which he was always most enthusiastically appreciative, ever ready to discuss a chemical problem, and, to the last, keenly interested in chemical progress.

Prof. Divers leaves behind him in England and Japan a host of friends who will long mourn the loss of a very sterling character. He was buried at Brookwood on Thursday last, April 11, and though, in consequence of the Easter holidays, many of his friends were away from home, the Royal Society, the Chemical Society, the Society of Chemical Industry, the Institute of Chemical Industry, and the Institute of Brewing were all represented at his funeral and the memorial service. In addition to the members of his family, the following were present, viz.:—Sir Wm. Tilden, Prof. Emerson Reynolds, Prof. Gowland, Prof. Mondy, Prof. Hodgkinson, Dr. Rudolph Messel, Messrs. Tyrer, Reid, Hemingway, Grant Hooper, Coste, Baker, Cresswell, Pilcher, Carr, and others.

NOTES.

The appalling disaster to the *Titanic* on Monday morning, by which more than 1300 of the passengers and crew have lost their lives, has brought several scientific subjects into prominence. Such subjects are: the dynamic effects of a mass of 50,000 tons moving at a speed of about 15 knots, the conditions of stability of a vessel built upon the watertight bulkhead system when an extensive injury has been isolated by closing the watertight doors, the beneficent use of wireless telegraphy in summoning assistance to a vessel in distress, and the means of detecting the presence of icebergs at a distance. The *Titanic,* which was making her maiden voyage from Southampton to New York, was the largest vessel in the world, and the most luxuriously equipped. She was installed with Marconi wireless telegraphy instruments having a sphere of influence with a radius of about 500 miles by day and treble this distance by night. The first news was the appeal for help which went throbbing through the æther and was detected by the wireless telegraphy operators on several vessels. The message was: "Have struck an iceberg 41·46 north, 50·14 west. Are badly damaged. Rush aid." This was at 10.25 p.m. on Sunday, New York time (3.25 a.m. Monday, Greenwich time). Several vessels hastened to the place of the disaster, but the nearest ship appears to have been 170 miles distant from the *Titanic* when the message of distress was received, and none of them was able to reach her before she foundered at 2.20 a.m. (New York time) on Monday morning—four hours after the collision with the iceberg. The *Carpathia* reached the *Titanic's* position at daybreak, and found boats and wreckage only. In the boats were 868 survivors of the crew and passengers—mostly women and children—the remainder of the human freight of 2200 souls having found a grave with the vessel in the Atlantic.

No more terrible disaster at sea than this has ever occurred; and that a vessel which was said to have been designed with all the precautions which engineering science can provide should meet with such a calamity on her first voyage is almost unbelievable. It was claimed that the vessel was practically unsinkable, yet she was only able to keep afloat a few hours after crushing against the iceberg. The existence of immense fields of ice and great icebergs, the visible parts of which are only about one-eighth the mass of the portions submerged, constitutes a danger in the North Atlantic against which no satisfactory safeguard has yet been devised. A vessel which represented the best work of science applied to marine engineering has disappeared with its burden of human lives beneath the waters of the Atlantic as the result of a catastrophe which could only have been avoided by following a course south of the danger zone caused by ice. Until science has suggested a practical means of detecting masses of floating ice at a distance sufficiently great to enable vessels to avoid them, and thus prevent calamities such as that which the nation now mourns, it is to be hoped that the steamship track across the Atlantic will be more southerly than that hitherto recognised.

The Memorandum on Naval and Military Aviation issued on April 12 provides for seven aëroplane squadrons of twelve machines each, one airship and kite squadron of two airships and two flights of kites, and one line of communication flying corps workshops —the total number of flyers required being 182 officers and 182 non-commissioned officers. It sounds the death-knell of the airship, in that it specifically states that the only advantage that this type of aircraft possesses over that of heavier-than-air lies in its ability to receive and transmit wireless messages over a large area. "It is hoped, however," says the memorandum, "that means will be found for overcoming difficulties in this respect, and experiments in this direction are now being conducted which give prospects of success." The other scientific aspect of this scheme is the desire to subsidise flying grounds or aërodromes, where safe landing places are available, all over the kingdom in order that cross-country flying—an essential for practice in military work—may be carried out in comfortable circumstances. This practically amounts to mapping out the whole country into air-ways, and from the meteorological point of view is of the greatest importance. From a settled system of cross-country flying, most valuable data will be obtained as to general wind direction and to the existence of "remous," or eddies, and what are now termed "holes in the air." No coordinated information is at present available as to where such aërial phenomena may be expected or as to their actual cause. The whole science in this respect is lamentably deficient, and the *hiati* may be filled up by the system of cross-country flying proposed. It is to be hoped that ample funds will be allotted to this new and important branch of both services, not only for the defences of the country but also on account of increased knowledge of meteorology.

We regret to learn of the death of Mr. A. Lawrence Rotch, director of the Blue Hill Meteorological Observatory, Mass., U.S.A.

The sixth annual meeting of the British Science Guild will be held at 4 p.m. on Friday, May 17, at the Institution of Electrical Engineers, Victoria Embankment, W.C. The dinner will be held on the evening of the same day at Prince's Hall, Piccadilly.

A Reuter message from Mobile, Alabama, U.S.A., states that the captain of a steamer which arrived there on April 10 reports the destruction of thousands of people and a number of Indian villages by an eruption of Chiriqui Peak, near Bocas del Toro, Panama, on April 5.

A course of four lectures on some mathematical subjects will be delivered at the University of London, South Kensington, on May 3, 4, 10, and 11, by Prof. Henri Poincaré, professor of mathematical astronomy in the University of Paris. Two of the lectures will deal with the philosophical aspects of mathematics, one with a subject in pure mathematics, and one with a subject in applied mathematics. Further information and tickets of admission may be obtained on application to the Academic Registrar, University of London, South Kensington, S.W.

The Board of Agriculture and Fisheries has been informed that the Lords Commissioners of his Majesty's Treasury, on the recommendation of the Development Commissioners, have sanctioned the payment from the Development Fund of a sum of 2,500*l.* per annum for three years to be distributed by the Board as grants to certain institutions in England and Wales to enable them to supply technical advice to landowners and others interested in forestry. Owing to inadequate resources, institutions possessing forestry departments have hitherto restricted their attention for the most part to imparting instruction to students. It is now proposed to attach an experienced forest expert to the forestry departments of two universities and three colleges, whose chief duty will be to supply to landowners and others advice as to the general and detailed working of their woods. Each institution will, therefore, become for a given district a centre for information, to which application may be made on all questions relating to the formation, treatment, utilisation, and protection of woods.

The annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Westminster, on May 9 and 10, commencing each day at 10.30 a.m. At the morning meeting on the first day, the retiring president, the Duke of Devonshire, will induct into the chair the president-elect, Mr. Arthur Cooper; the Bessemer gold medal for 1912 will be presented to Mr. J. H. Darby; and the president will deliver his inaugural address. On the morning of May 10, the Andrew Carnegie gold medal for 1911 will be presented to Dr. P. Goerens, of Aachen, and the award of research scholarships for the current year will be announced. Among the papers to be read and discussed during the meeting the following may be mentioned:—Dr. J. O. Arnold will deal with the chemical and mechanical relations of iron, vanadium, and carbon; Sir Hugh Bell, Bart., will described a bloom of Roman iron from Corstopitum (Corbridge); Mr. C. Chappell will discuss the influence of carbon on corrosion; and Dr. J. N. Friend, J. L. Bentley, and W. West the corrosion of nickel, chromium, and nickel-chromium steels and the mechanism of corrosion. Sir Robert A. Hadfield, F.R.S., will describe Sinhalese iron and steel of ancient origin, and Dr. H. Nathusius, of Friedenshütte, Upper Silesia, the improvements in electric steel furnaces and their application in the manufacture of steel.

In the House of Commons on April 10 Mr. Lewis Harcourt, Colonial Secretary, announced that the terms of reference to the Royal Commission on the Trade Resources of the Empire are as follows:—To inquire into and report upon the natural resources of the Dominion of Canada, the Commonwealth of Australia, the Dominion of New Zealand, the Union of South Africa, and the Colony of Newfoundland; and, further, to report upon the development of such resources, whether attained or attainable; upon the facilities which exist or may be created for the production, manufacture, and distribution of all articles of commerce in those parts of the Empire; upon the requirements of each such part and of the United Kingdom in the matter of food and raw materials, and the available sources of such; upon the trade of each such part of the Empire with the other parts, with the United Kingdom, and with the rest of the world; upon the extent, if any, to which the mutual trade of the several parts of the Empire has been or is being affected beneficially or otherwise by the laws now in force, other than fiscal laws, and, generally, to suggest any methods, consistent always with the existing fiscal policy of each part of the Empire, by which the trade of each part with the others and with the United Kingdom might be improved and extended.

We record with regret the death on April 12 of Dr. William Ogle, a distinguished statistician and physician, in his eighty-fifth year. He held the office of superintendent of statistics in the department of the Registrar-General of Births, Deaths, and Marriages for England and Wales from 1880 to 1903, in succession to Dr. William Farr. In that capacity he continued the practice of his predecessor by contributing to every annual report of the Registrar-General a memoir on some subject of interest arising out of his researches. He became a member of the Statistical Society in 1885, served on its council, and contributed papers on the alleged depopulation of the rural districts of England, on marriage rates and marriage ages with reference to the growth of population, and on the trustworthiness of the old bills of mortality. In 1891 the well-deserved compliment was paid to him of election to the Athenæum under rule 2 of that club, as distinguished in science and for his public services. He was also a member of the Institut International de Statistique. His services to medical science as secretary of the Royal Medical and Chirurgical Society, lecturer and physician at St. George's Hospital, medical officer of health, and in other positions, were conspicuous, and he contributed to medical literature translations of Aristotle and other works. He belonged to a medical family, being a son of the Regius professor of medicine at Oxford. There he took the degree of M.D. He became a fellow of the Royal College of Physicians in 1866. In official, scientific, and academic circles he was highly esteemed, and many friends will mourn his loss.

In the January-February issue of *L'Anthropologie* MM. Breuil and Obermaier contribute an account of the operations of L'Institut de Paléontologie Humaine, recently founded by that enthusiastic student of the sciences, Prince Albert I. of Monaco. Its work is at present largely devoted to an exploration of those caves in the Spanish peninsula which were occupied by primitive man. That at Valle, in the province of Santander, has produced some harpoons of the Azilian and Magdalenian periods, and a bone engraved with a group of horses. From the Hornos de la Peña cave we have a frontal bone of a horse, with a drawing of that animal. The newly discovered cave containing frescoes at La Pasiéga supplies drawings of a stag and a chamois. Of special interest are the sketches of primitive hunters pursuing stags with their bows and arrows, and some rudely conventional representations of human beings from caves in Almeria, Andalusia, and Murcia. The Institute founded by Prince Albert has thus undertaken a wide scheme of exploration which is sure to supply material of the highest importance to students of primitive man.

M. J. Dechelette, in *L'Anthropologie* for January-February, suggests a new interpretation of the origin of the spiral carvings at the grave-mounds of New Grange and Gavr Inis, which Mr. G. Coffey and other British authorities recognise to be an extension of the great Ægean spiral motive which passed through a large part of Europe in the early Bronze age. M. Dechelette now endeavours to trace the pattern through seven types: tattooed images of the Mother goddess of the Ægean area, and figurines from the second stratum at Hissarlik; anthropomorphic pillars from Fivizzano in Italy; Sardinian menhirs; plaques from the Iberian peninsula; menhirs and cave sculptures, with fragments of vases, from France; cylinders from Folkton Wold in Yorkshire; and Scandinavian vases. This essay, which is well provided with figured representations of the assumed transitional types, is sure to furnish material for discussion. The art student will probably desire more evidence of the approximation of these motives in their original home, the Ægean area, whence, whatever the exact source may be, the type was certainly derived.

IN the April issue of *Man* Mr. Harold Peake describes an elaborate scheme for an anthropological survey of the British Isles. It is intended to include not only the physical types from which the existing population has been derived, but extends to all forms of human activity, both in the past and at the present day. It is proposed, as part of the project, to compile a series of maps showing the course of distribution of trade articles in prehistoric times—bronze celts, amber, pigs of lead, and the like—with the position of the mines of gold, copper, and tin known to the ancients. In order to afford facilities for comparing the culture of the past with that of the present, he suggests the preparation of maps showing soil and vegetation, the distribution of woodland and marsh, the mineral supply, the distribution of the Neolithic people, the early centres of metallurgy, and the movements of invading tribes. As regards existing facts, we need surveys of the density of the present population and its economic conditions, such as the prevalence of lunacy, poverty, and crime. He proposes to initiate this elaborate scheme through a central bureau working in cooperation with field clubs, county museums, and the like. There can be no question that such material, if collected in a scientific way, would be of great service; but it needs an amount of cooperation between the unorganised body of workers which, for the present at least, is not within the range of practical politics.

MR. H. HABENICHT of Gotha, in a pamphlet on "Die antediluvianischen Oasen bei Taubach und Tonna," attributes the occurrence of northern erratics in the Thüringian loess to catastrophic flooding, which took place at the close of the steppe-epoch that followed on the first extension of the continental ice. A picturesque detail is drawn from the fossil birds' eggs in the Taubach tufa; the flood broke across Thüringia "on a fine day of early summer." This overflow, however, was general, owing to a sudden subsidence, and the mammoth—its hairy covering notwithstanding—is said to have been thus transported northwards. The damp atmosphere, checking the sun's rays, is held responsible for the second extension of the ice. The author, however, does not hope for general sympathy in his revival of the belief in a universal deluge.

LAST year the Marine Biological Station at St. Diego celebrated the twentieth anniversary of the movement that led to its foundation, and advantage was taken of the occasion to publish an account of its rise, progress, and future. This has been drawn up by Mr. W. E. Ritter, and issued as No. 4 of vol. ix. of the University of California Publications in Zoology. The scope of this report is very wide, taking into consideration the larger meaning of science in general, and of biology in particular. Reference is made to the present condition of the station, to the work already accomplished, and to projects for the future. In the concluding section it is urged that every scientific institution ought to do something towards diffusing an accurate knowledge of modern scientific work among the general public. This should be done—largely through the public press—by persons who have themselves been engaged in scientific work, and should by no means be left to those who merely read up science.

FOR several years past Prof. E. C. Case has been working at the wonderful Permian vertebrate fauna of North America, and some of his latest results are embodied in "A Revision of Amphibia and Fishes" of this formation, published as a quarto memoir by the Carnegie Institution of Washington (1911). The memoir opens with a review of previous work on the subject, this being followed by a table of the classification of the Amphibia as now revised, after which comes a detailed synopsis of the various groups. With the exception of one genus referred to the same group (Urodela) as modern salamanders, the whole of the amphibians are referable to the stegocephalians, or labyrinthodonts, in the classification of which the author follows in the main the lead given by Cope. A discussion of the fishes is given by Mr. L. Hussakof, who concludes with a comparison of the fish-fauna of the Permian of America with that of Bohemia, in which it is pointed out that there is a great similarity between the two, with the exception that the acanthodian sharks are unrepresented in the American formation.

THE Journal of the Royal Society of Arts of March 29 contains the report of a lecture on modern whaling, delivered by Mr. T. E. Salvesen at the sixteenth ordinary meeting of the society. After an historical account of whaling, the lecturer stated that the great recent development of the industry has taken place in the southern hemisphere, where the chief objects of pursuit are rorquals and humpbacks. In South Georgia 7000 whales, yielding some 200,000 barrels of oil, were taken last year; in the South Shetlands the catch was 3500, and in South Africa 4000, the total number of whales taken during the season to the south of the equator being about 17,500, with a yield of some 500,000 barrels of oil, and a gross value of about 1,750,000*l.* For the whole world, the catch was about 22,500 whales, with a yield of some 620,000 barrels of oil. The present year's take is expected to exceed that of 1911 by at least from 10 to 15 per cent. It is a matter for regret that in the discussion which followed the paper no one pointed out the serious nature of this enormous drain and the urgent necessity of an inquiry to ascertain what effect it is having on the numbers of the whales. On the face of it, no species appears likely to be capable of holding its own against such tremendous slaughter for any length of time.

THE threatened extinction of the sandal tree (*Santalum album*), which occurs over a limited area in India and is practically absent elsewhere, and the great economic value of sandalwood oil, have led to many attempts to extend its area by plantings and sowings, but these have been rarely successful, owing to the fact that, although the sandal is a root parasite, absolutely dependent upon other plants for its nourishment, it has in most cases been treated like other trees in the methods adopted for its propagation. M. Rama Rao has just published (*Indian Forest Records,* ii., 4) an elaborate account of the host-plants of the sandal, in which he describes the relations between the roots of this tree and those of more than 250 species found growing in association with it. Of this number no fewer than 150 species are actually host-plants attacked by the roots of sandal, and the author believes that further investigation will result in additions to this remarkable census. Apparently evergreen plants are better hosts than deciduous species; sandal plants growing on evergreen hosts themselves remain evergreen, while those on deciduous hosts actually become deciduous; and there is a marked tendency for the sandal to become deciduous in very dry localities, where the plants associated with it are few and are deciduous.

A SEVERE earthquake was felt in South Africa on February 20 at 3.4 p.m., especially in the south-western portion of the Orange River Colony. The shock is remarkable for the large area over which it was strong enough to damage buildings. This area, so far as can be judged from the numerous accounts published in *The Cape Times*, is about 150 miles in diameter, and contains more than 17,000 square miles. In Kimberley and Bloemfontein a few houses were injured, but the epicentre of the earthquake lies about 50 miles to the south-east of Kimberley, in the neighbourhood of Koffyfontein, Jagersfontein, and Fauresmith, at which places, also, most of the after-shocks were felt. Although many buildings were demolished and the ground fissured in this district, the earthquake was not one of very great intensity, though unusually strong for the South African colonies. It was felt, however, over a very wide area, from Paarl (480 miles to the south-west of the epicentre) to Mafeking (250 miles to the north), Johannesburg (290 miles), and Durban (360 miles to the east). The disturbed area must therefore have contained about half a million square miles.

THE last Bulletin (vol. iv., No. 3, 1912, Tokyo) of the Imperial Earthquake Investigation Committee consists of Prof. Omori's third paper on the applications of the seismograph to the measurement of the vibrations of railway carriages. The recent experiments were made in a new imperial carriage and a first-class carriage, both six-wheel bogie-cars, and weighing 36 and 27·3 tons respectively. The trains containing these carriages were similarly made up and run along the same course with approximately the same velocities. The records in the two carriages in the same portions of the course were so similar that individual vibrations could be identified, especially in the lateral-vibration curves. The intensity of the vertical vibrations in the imperial carriage was 40 per cent. less, and of the lateral vibrations 26 per cent. less, than in the other. Under ordinary conditions, the maximum acceleration recorded in the imperial carriage amounted to 1100 mm. per second per second for the lateral vibrations and to 2000 mm. per second per second for the vertical vibrations, the latter being nearly as great as that experienced at Nagoya during the great Japanese earthquake of 1891. The vertical vibrations in the same carriage were practically unaffected when the train entered on a curve of from 20 to 60 chains radius, but the lateral vibrations, though unchanged when the velocity ranged from 25 to 30 miles an hour, were nearly double as large as on a straight road when the velocity was as low as 15, or as high as 40, miles an hour.

THE report of the work of the Prussian Meteorological Institute in 1911, issued by Prof. G. Hellmann, states that the existing materials are so great that it was thought advisable to devote as much time as possible to the deduction and publication of results, rather than to take up fresh observations. The report contains several interesting and useful short discussions, to one or two of which we hope to refer later on. The arrears in the discussion of magnetic observations have been brought up to date. A curious incident relating to the uncertainty of the needle-inclinometer is reported. Four needles had been in use, three of which gave concordant results, and the fourth very discordant values, and its use was given up; but some years later it was discovered that the discarded needle was the one which had given correct results. At the end of 1911 the meteorological stations numbered 201, exclusive of a very large number of rainfall and thunderstorm stations. The Potsdam, Brocken, and Schneekoppe observatories are entirely maintained by the institute. It is pleasing to note that his Majesty the Emperor confers from time to time special honours on both officials and observers of long standing.

IN the Trans. Roy. Soc. of Canada (vol. v., sec. iii., 1899) Dr. W. Bell Dawson gave illustrations of some remarkable sea-seiches, or secondary tidal undulations, which occurred in the estuary of the St. Lawrence. He remarked that they seem to be connected with stormy weather. The subject is resumed in a paper jointly by Mr. Kôtarô Honda and Dr. Dawson, published in the Science Reports of the Tôhoku Imperial University, vol. i., No. 1, p. 61 (1912), in which they discuss the periods of the Canadian seiches, showing that they conform to the Japanese theory. The authors are of opinion that the seiches are due to meteorological causes. In the Proceedings of the Tokyo Mathematico-physical Society for February, p. 196, Mr. Honda traces the connection between the advance of a barometric depression and the sea-seiches observed at eight ports in Japanese waters.

The new catalogue of physical apparatus issued by Messrs Baird and Tatlock (London), Ltd., is a quarto volume of 650 pages, and is well illustrated. It contains descriptions of several new pieces of apparatus, as, for example, the induction solenoids on p. 536, and Milner's automatic mercury pump. It would be an advantage if British instrument makers would in their new catalogues cease to figure and describe apparatus hopelessly out of date, like Lavoisier and Laplace's ice calorimeter.

The theory of the universe which was propounded eight years ago by the late Prof. Osborne Reynolds in his "Sub-mechanics of the Universe" has found a popular exponent in the person of Mr. J. Mackenzie, a copy of whose lecture on the subject, delivered before the Minnesota Academy of Sciences and the American Association for the Advancement of Science at Minneapolis, has just reached us. It contains a clear account of a theory which is not by any means easy to follow in the original, and is illustrated by several figures of Prof. Reynolds's experiments, including that of the thin indiarubber bag partly filled with sand which supports 200 lb. on its edge. A good portrait of the late professor serves as a frontispiece.

Special Publication No. 9, 1911, of the U.S. Coast and Geodetic Survey contains a magnetic declination chart for the United States for the epoch January 1, 1910. It also gives secular change data—in continuation of similar data in earlier publications—for a number of selected stations. In the east, westerly declination is increasing more rapidly than in 1905. In the North Atlantic States, where the change is most rapid, it is now about 6′ a year. In the western territories easterly declination is increasing, also more rapidly than in 1905. The rise is now as much as 5′ a year in some places a little inland from the Pacific coast. The changes in progress at present throughout the United States are so complicated that it is impossible to predict their course even a few years ahead.

It has long been known that traces of hydrogen peroxide are found in rain water and in snow, and that during the day the proportion is greater than at night. In 1909 it was shown by Miroslaw Kernbaum that the ultra-violet rays from a quartz mercury-vapour lamp decompose water according to the equation $2H_2O = H_2O_2 + H_2$, a fact which suggests that the hydrogen peroxide in rain water owes its formation to the action of solar ultra-violet rays on water vapour in the upper region of the air. The correctness of this hypothesis has been since verified by M. Kernbaum (*Bull. International Acad. Sci. Cracovie*, 1911, p. 583), who finds that ordinary sunlight even at the earth's surface is capable of demonstrably producing the same result in water enclosed in a quartz flask, both hydrogen and hydrogen peroxide being formed in minute quantities after a few days' exposure to the rays of the sun in July. In such a case the action of the ultra-violet rays is necessarily less than in the upper atmosphere, owing to their absorption in passing through the air.

An illustrated description of the Ljungström steam turbine appears in *Engineering* for April 12. This machine is of the reaction type, and has been designed by its inventor—a Swedish engineer—so as to avoid some of the defects which are inherent to this kind of turbine. The flow is radial, the steam being admitted between two discs, and in its passage from their centre to their circumference, passing between concentric blading rings carried alternately by the two discs. In the usual design, both the discs revolve, driving their shafts at equal speeds, but in opposite directions, and to each shaft is coupled an electric generator. The relative speed of each set of blades is thus twice as great as in a standard reaction turbine of equal revolutions and diameter, hence for equal efficiency the total number of blade rows is only one-quarter as great. By the disc arrangement distortion troubles are avoided, hence the machine lends itself to the use of steam superheated to the highest degree. The general design makes an astonishingly small turbine for the power developed. Experiments have been made with a 500-kw. machine, and one of 1000-kw. capacity has just been finished and thoroughly tested.

OUR ASTRONOMICAL COLUMN.

The Solar Eclipse of April 17.—At the moment of going to press, the following telegram has reached us from Dr. Lockyer and Mr. F. Maclean, *viâ* Paris:—"Camp American line on road three-quarters mile north-east Chavenay practically central Bailey's Beads no corona prominences eight and two o'clock duration about two seconds. Weather perfect.—Lockyer, Maclean."

A Daylight Meteor.—Mr. Hugh Ramage, organiser of higher education, Norwich, sends us some extracts from *The Eastern Daily Press* of April 3, 4, 6, and 8, containing observations of the daylight meteor of March 28, referred to last week (p. 147). Mr. W. F. Bushell, Gresham's School, Holt, states that the meteor was observed at about 2.45 p.m. It was seen by several observers, who agree in stating that "it left behind a yellowish-green track, which faded away almost directly. The meteor appeared in the northern part of the sky, and seemed to be travelling in an easterly direction. The sun was shining at the time."

The Nova, or Variable, in Perseus, 87·1911.—The supposed nova discovered by Mr. D'Esterre is the subject of some further notes in No. 4564 of the *Astronomische Nachrichten*. This object is of especial interest at the present juncture, when so many attempts are being made to explain the appearance of novæ, for it appears to consist of several condensations, of changing aspects, surrounded by nebulosities, or themselves nebulous. Whatever the object itself may be, it is evident that the region is one of considerable interest, which should be carefully examined with more powerful instruments.

A New Star Catalogue.—Astronomers are indebted to Mr. Backhouse for a valuable new star catalogue of 9842 stars, containing all stars very conspicuous to the naked eye. The catalogue is intended as a complement to a set of maps designed especially for the use of meteor observers, but should be found very useful by all astronomers. In addition to the various